April 15, 1949.

Dear Max,

I am enclosing 10 g. d-xylose which may be able to tide you over until your own order is filled. We just got hold of this ourselves; our old supply had just become depleted.

I've looked at the cultures you sent this last time, and find all of them mixtures of Lac-/# and Xyl-/# when expected. 2-160 is almost entirely Xyl- but there were a very few "papillae" of Xyl# indicating that it had been mixed. On Lac these could not have been told from reverse-mutation, but Xyl- is exceedingly stable, and I have never seen a reversion. However, I saw very few mosaic colonies, but for most of the cultures, this has no pressing, immediate importance.

The family 2: 199-202 was looked at most carefully. 199 is of course Lac-Xyl-. From its sisters and cousins I tried to reisolate the mosaic or heterozygote, but so far have failed. I was especially interested to verify whether 2:200 was really still heterozygous, but so far have been able to recover only # and -. I haven't looked yet to see whether all the recombination types are represented in the culture, i.e., Lac#Xyl-; Lac#Xyl#; Lac-Xyl# and Lac-Xyl-. I think that a distinction should be made between cells from which segregating heterozygotes can be recovered, and those where heterozygosis is inferred from a mixture of # and -. You state that 2-200 was mosaic, and I was able to verify a similar situation (demonstrable heterozygotes as sibs of segregants) in the last batch you sent, so I don't doubt it. I haven't looked yet at 2:200. The reason that these two kinds of heterozygotes should possibly be differentiated is in hopes of picking up the first reduction-division

of meiosis. But from the looks of it already, the nuclear situation is rather complicated, and may hopelessly obscure the situation.

I hadn't thought that H-72 was any less unstable than H-1 or H-62. Nor is H-168.

You may be interested in some segregation data on H-168. Mosaic colonies were individually streaked out on the indicated medium, 1 - and 1 # picked from each and tested on the several sugars.

Of 100 paired selections on xylose EMB:

Xylose#				Xylose-	
Lac	Gal	Mtl			
-	-	#	98	2	*
-	-	-	1 *	54	
-	#	#	0 *	0	
-	#	-	0	0	
#	-	#	1	0	
#	-	-	0	1	*
#	#	#	0	1	*
#	#	-	0	42	
			100	100	

The rare * types were checked to see if there was any reciprocity in the streak from which they came. None was found. Only occasionally was another representative of the * found in the streak, so each mosaic represents a large number of indepenedent segregants, although not an infinite population suitable for statistical analysis.

Of 100 or original paired selections on lactose (in a few streaks, one or the other class could not be cleanly isolated)

Lactose #				Lac-
Gal	Mtl	Xyl		
#	-	-	92	0
-	-	-	0	92
#	#	#	1	0
-	#	#	0	1
-	#	-	0	1
others 0				
			92	97

Again there were no reciprocal correlations.

These data give the best estimate of the true mean segregation frequency of Lac, Xyl, etc. The fact that both Lac- and # give a low proportion of Xyl # (ca 1%) shows that the segregation of Lac in the Xyl- selections gives an unbiassed estimate, uninfluenced by fluctuations from mosaic to mosaic, of 56% Lac-. This is quite different from what is found in H-72, I don't know why. Lac and Gal are almost completely linked, as are Xyl and Mtl. In prototroph segregants from transient zygotes, there is much more crossing over between Lac and Gal. You will also notice that in the first set above, there is much more between Xyl and Lac among the Xyl- than the Xyl#. This presumably has something to do with the aberrant region. Finally, recippocals of the rare types could not be find. This fits your observation that segregants are not paired with segregants; the opposite type presumably gives an inviable nucleus.

Hope to have a long talk with you in Cinncinnati. I expect to give a 10 min. paper on this stuff. Let me know your plans; maybe we can work out some way to bring our stuff together.